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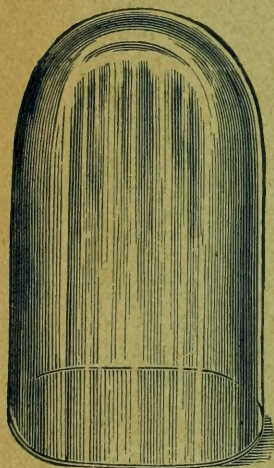
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THE STICKLEBACK.

(*Gasterosteus*.)

Of the five or six species of the sticklebacks that live in American waters, the *Gasterosteus aculeatus* or two-spined stickleback is, as far as our experience goes, the most interesting one for the fresh water Aquarium. We have pairs of them building nests and hatching out their young in our tanks every spring, and as we can approve to the description given by Dr. Lankester, of England, we give his article. He says:

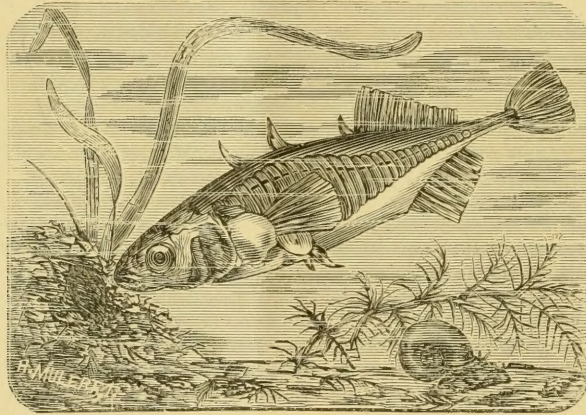
"I mention this little fish first, because I think he has claims to the rank of the king of fishes. Whether we regard his high organization, his courageous nature, his domestic habits, his varied instincts, his power of living in all waters, at all temperatures, he is fairly entitled to take the first place among fishes, and high rank in the animal scale. And where is this wonderful fish to be got? The nearest pool, pond or ditch that has life in it, is sure to have sticklebacks in it. Take a walk on the nearest road out of any country town, and the chances are that the first boy you meet with a blacking bottle or a pickle jar in his hand, has got sticklebacks in it. They are the first game

of the youthful sportsman all over Great Britain. You need not catch them yourself; a penny will buy a score of them from any of these urchins. But should you wish to catch them for yourself—always a great pleasure, and an art to be cultivated—then a hand-net will take them by dozens; but this is a cowardly, wholesale way. If you wish for 'sport' at the same time, you will angle for them, not, however, with cruel hooks. The stickleback is much too brave and incautious a fellow to need a hook. A little red worm, at the end of a piece of twine, is all that is necessary to secure him. Once having seized the worm, he never lets go, though you drag him out of one element into another. When you have secured your stickleback, you must not inconsiderately place him with other fishes. I have asserted that he is a royal fish, and you will soon discover that he will bear no rivals. No sooner is he fairly free in your Aquarium than he recommences his reign and not always, I must confess, of the mildest sovereignty. The chances are, if you put him with fish of his own size, you will find them all dead in the morning. Sad spectacle! disemboweled by the use of

our pet's spine upon his neighbor's stomachs, their eyes picked out as delicate morsels for his morning meal. This, therefore, must be a warning to you; if you have but one jar, and wish to keep sticklebacks you will probably not have an opportunity of keeping any other fish, of his own size at least.

“But he will repay you for his disposition. He has all the ways of other fishes, and many more besides. Look into your tank—see, there is one larger than the rest; he is clothed in a coat of mail, like a knight of old, and it is resplendant with purple and gold.

eggs, and having done this, resigns the care of them to our hero of the purple and gold, who watches over them with an anxiety that no other male in creation but the male stickleback seems to know. He fans and freshens the water with his fins, and at last, when the young are hatched, watches over their attempt at swimming with the greatest anxiety. Nor is this habit confined to the fresh water sticklebacks. A lady, writing to me from Aberdeen, and describing her aquarium says: ‘A fifteen-spined stickleback (*Gasterosteus spinachea*) constructed a nest on a piece of



THE TWO-SPINED STICKLEBACK.

See how his eye glisten, and with every movement present a new color. He is a male fish, the king of your little shoal. He has important offices to perform. Presently, in the course of a few days if you watch him, and are fortunate, you will see this wonderful little fish engaged in the most useful manner in building a nest. He first seizes hold of one little bit of weed, then of another, and carries them all to some safe corner, till at last his nest is built. Having done this, he gently allures his mate to their new made home. Here she deposits her

rock, which was covered with a fine green seaweed, and laced altogether with a long thread, composed, apparently, of some secretion. The fish afterwards, for about the space of three weeks, watched the nest, never leaving it at all, save for the purpose of driving away other fish, when they approached too near. When a stick was introduced into the vicinity of the nest, the fish would fly, open-mouthed, to attack it, and would bite it with great apparent fury. At the expiration of the above named time, the young fry made their appearance by

hundreds; but I am sorry to say they soon disappeared, being devoured by the other fish, and caught by the tentacles of the sea anemones. The mother-fish continued her attendance at the nest as long as any of the young fry were left.'

"The stickleback is very tenacious of life, and will live out of water for several hours. I was watching, a few mornings since, on the sea shore, where some fishermen had left the refuse of their nets the night before; all the animals were dead, except a solitary stickleback, who still survived and being placed in the sea, scuttled off again as through nothing had happened. The fresh water species are often taken at sea at the mouths of rivers; and Sir Edward Belcher informs me that he took a specimen whilst dredging at sea during the last Polar voyage."

A water temperature of 60 to 70 degrees F. seems to be the most favorable during breeding time. If possible, each male should be supplied with two females. After the female has deposited the eggs and left the nest the male chases her away from the nest and enters it himself, remaining in it from two to three minutes. After this he closes the hole out of which they had left the nest and takes his position before the entrance, fanning the eggs day and night, only leaving them to inspect the surroundings or to drive away an enemy. He takes the eggs out of the nest from time to time to assort them, carrying away the bad ones, and placing the good ones back in the nest. This is done some days four times. The number of eggs in one deposit of a female is from thirty to forty, and about five such deposits are made in intervals of about a week; only two-thirds of

them, however, become young fish. Considering that one male takes the eggs of four to five females in one nest, and after these deposits are hatched goes to "housekeeping" again until the hot weather approaches, he can get up a pretty numerous family in one season.

Sticklebacks are very intelligent fish. The first Stickleback that engaged in nest-building in one of our tanks had, having the first pick, used up the best building material; when he had completed building, hardly any was left. A second one which now commenced to build had no other chance to get choice material than by stealing it from the nest of the other. To that effect he made himself appear too busy to notice anything else than his own nest—but as soon as the other stickleback left his nest to go in search for this or that in order to still "improve on it," or to the other end of the tank to "court," he would sneak through the cavity of the rockwork, taking advantage of every stone or plant to hide behind and keeping closely to the bottom at the same time, to the other one's nest. There no time was lost; he tore off what he found was most useful and with a big mouthful of building material he would return just as carefully over the same sneak road to his own nest, which was a much greater distance than the ordinary honest road. Once he was caught in the act of stealing and a fearful fight followed, which lasted about five minutes, and which was finally decided by the females who took part with the thief and drove the other back to his estate.

The twelfth day after the eggs are deposited, the young fish make their appearance; the old ones should now be taken away from them, as they will eat

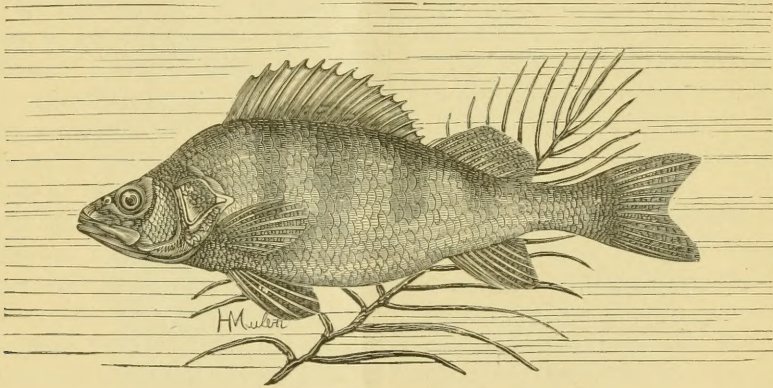
them, and placed in another aquarium, well stocked with plants. About half an hour after introduction into their new home they begin to build a new nest. But now not so much pains are taken in constructing it; perhaps that in higher temperature, it being spring now, the eggs need less protection.

THE YELLOW OR RING-PERCH.

(*Perca Flavescens*.)

The perch, if not of too large size, in which case he would be dangerous to his neighbors, is exceedingly well suited to the aquarium, both on account of

damp moss, and if not sold, taken back and put into the pond again. The perch frequently attains four pounds in weight, or even more. Donovan, in his "History of British Fishes," says they have been taken from Bala Lake weighing five pounds; and it is stated by Yarrell, that a gentleman residing near Dudley took one six pounds in weight from the Birmingham canal. Colonel Montague records the capture of a perch of still greater size, stating that one was taken in the Avon, in Wiltshire, with a night-line, baited for a pike, which weighed eight pounds, dimensions which Pennan's famous



YELLOW PERCH.

his robust constitution, and his susceptibility of being tamed, to say nothing of his handsome appearance. Perch have been known to breed in small vases, and there is little doubt that they might, with only ordinary care, bring up a numerous family in a well-managed aquarium. They are so hardy that they live for many hours out of water, and revive when put in again without appearing to have sustained much injury. In Catholic countries, where fresh fish are much more prized than with us, fine perch are often brought to market and exposed for some hours on open stalls, upon a little

specimen considerably exceeded, the one he records as taken in the Serpentine weighing nine pounds. This must have been a magnificent fish, but it is stated by Block that a head of a perch in the church at Luehlah, in Lapland, measuring nearly twelve inches from the nose to the gill cover. This, however, must doubtless be the head of some allied species, and not our common perch; probably the last of some now extinct species.

The coloring of a healthy and well marked perch is very striking. The back and upper parts are of a rich olive-brown, variegated by several broad

bands of a dark, purplish hue. These upper tones pass into rich golden tints, which grow gradually paler till they become nearly white underneath. The ventral, anal and caudal fins are bright orange, the others different shades of brown, the dorsal ones being marked with a few black spots.

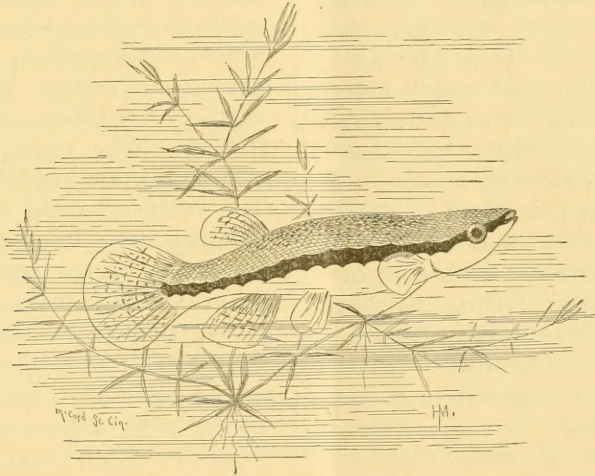
Specimens of the perch are occasionally found nearly white in ponds impregnated with the particles from particular soils, and they retain this color even when removed to other waters. A white perch would form a splendid addition to the aquarium, but such a prize

have dreamt of without some previous knowledge concerning them.

AN OLD FRIEND IN A NEW ROLE.

ANACHARIS CANADENSIS AS A DISINFECTANT.

It does one good to hear occasionally a good word regarding an old friend. Some twenty years ago we were in certain localities of the Ohio Valley attracted by the luxuriant growth of a species of aquatic plant. The growth as seen below the water surface, covering the bottom densely, made the bot-



THE STRIPED TOP-MINNOW OF THE OHIO VALLEY AND A SPRIG OF
ANACHARIS CANADENSIS. (Natural Size.)

is but rarely to be met with. It should be observed here that fish placed along with the perch should be of nearly or quite his own size, as he is terribly piscivorous.

We think it desirable to know something of the character and antecedents before introducing fish into an aquarium, as the more we know respecting their habits, qualities, history, etc., the more we shall find them surrounded with pleasing and instructive associations, and capable of inspiring many kinds of interest which we should not

tom appear like a submerged miniature forest. Upon closer inspection we found that this plant was the much despised "canal pest" (*Anacharis canadensis* or *Elodea alsinistrum* of others). But little was known then regarding its properties except that it was a very troublesome water-weed, obstructing navigation and for that reason the characteristic name of canal pest was given it. In Europe, to which country it had been brought by scientists who use it to study the circulation in the leaves under the microscope, it

was soon also condemned, Germany even going so far about ten years ago as to offer a premium for a successful plan to exterminate it.

The plant, as we saw it, with the eyes of a fish-culturist, was a beautiful, graceful plant of a brilliant green color, the leaves arranged in sets of threes around smooth, round stems, the latter shooting in all directions, soon forming quite a little wilderness in the water. We introduced it in our tanks, and also in our ponds, where it proved itself a very powerful oxygenator and great fish food producer. We used it especially when fixing up hospital tanks, as it seemed to impart new life to sick fish, and when, years ago, the so-called "Lobster plague" destroyed nearly every fresh water lobster throughout Germany, a calamity through which about 1,400 families lost their income, we recommended the planting of anacharis in the infected waters as a remedy.

In one of the recent numbers of *Die Deutsche Fischerei Zeitung* we read "that Dr. Brandes, of the Health Commission, has made the discovery that the once so much despised canal pest (*Elodea canadensis*) is a great water purifier, destroying many injurious microbes, especially those that cause Typhus, Cholera and Malaria. Dr. B. has the plant under observation since 1886, and he finds that localities in which dysentery and chills and fever were a standing plague are now, since anacharis has been introduced into the ponds and ditches of these sections, entirely free from these diseases. Cuttings of this plant have been sent to Java, S. E. Africa, to the Congo and other sections where malaria abounds, for acclimation, and the results, it is claimed, are already noticeable."

It seems that the many learned men

who years ago used to charge the writer with placing entirely too much importance into the aquatic flora should be silenced in view of such facts.

A CARP IN CITY SERVICE.

One of the supplying pipes of the city water works in a city in Germany needed frequent cleaning of the rapid growing water weeds. Several efforts to give the pipe a thorough cleaning failed, until a man was struck with the capital idea to use a fish to make a connection with the two tanks. A carp was put into a small vessel, and on his dorsal-fin a thin but strong line, which was varnished, to prevent the water from soaking into it, and thus making it too heavy for the fish, was fastened. The vessel was now held close to the pipe and the fish entered it. The distance he had to travel was six hundred feet. He had to go straight forward, as his size prevented him from turning himself around. Several times it was noticed, by the line, that he stopped, but when he had reached the second half of the distance he had to travel the water has a stronger fall, and he did not try to stop any more. He arrived at the other end after two hours, with the line still attached to his dorsal fin. He was very weak from his work, and easily caught. A stronger rope was now pulled through the pipe, and with this a wire cable was put there stationary, on which brushes can be run through when necessary. The poor carp did not live long enough to be used as the customary Christmas dish, but had to be killed soon after he had performed his valuable service.

Did you pay your last year's subscription to THE AQUARIUM?

WINDOW CONSERVATORIES.

Of window ferneries we have seen few better than those in the coffee-room at the City of London Club, near the Bank of England. The room is sixty feet long, thirty feet wide, and thirty feet high, and at each end there is a central mantelpiece, with a large mirror over it, and a window upon either side of the fire place. The lower halves of these four windows open into a miniature conservatory of foliage plants, and a different appearance is presented by each of them.

Each window-sash is four feet six inches wide by five feet high; but this does not indicate the size of the ferneries, which are eight feet wide and seven feet high near the window-pane, with a glass roof sloping off to six feet in height at the back. They are four feet deep.

We are careful in giving these dimensions, because window conservatories are too often constructed of just the same width as the window and with the bottom on the same level with the window-sill. In those here figured the space for growing ferns extends for more than eighteen inches on either side of the window, so that large plants can then be used, and portions only of them contribute to the general effect in the room—an important advantage, which could not be otherwise obtained. Again, the depth of the conservatory below the window-sill is another great advantage, since it permits the use of much taller plants than could otherwise be employed.

One of the conservatories has on its right a series of pocket-like pools on the face of the rocks, with a stream trickling down from one pool to another, until it is lost amongst the

plants growing at the bottom. This trickling is not seen unless the observer is close to the left side of the window; but a reflection of it is seen in a good sized mirror placed diagonally across the further left angle of the case, apparently at the end of a deep cave, the edges of the reflecting glass being connected with the rock work which is covered with ferns.

Another has for its central object a fine young plant of *Cibotium princeps*, under the gracefully arching fronds, of which a little fountain mimics the curves of the fern above. In this conservatory two pieces of reflecting glass are inserted in the rock work at the back, one on the extreme right, the other on the extreme left, the result of which arrangement is that the sides of the conservatory are repeated, and that the conservatory appears to be twice as deep as it really is.

The third has a deep aquarium, through which a stream of fresh water flows, entering below and overflowing into a cavern on one side. The rock work is here arranged so as to carry out the leading idea of a large pool, the surplus water of which descends into another pool which is out of sight, and the contents of the upper pool are rendered visible through a sheet of stout plate glass on the side nearest to the window.

The fourth has a dashing cascade just in front of the spectator, the water falling upon a shallow ledge of rock, which causes a greater splash than if it fell into a pool. There is much less light in the last two cases than in the others, owing to the nearer proximity of tall buildings, and consequently the foliage is neither so varied nor so luxuriant. This drawback is, however, overcome by using here a preponder-

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ance of such plants as have been found to do best under those unfavorable conditions.

It will have been noticed that, in all the four, water plays a not unimportant part and, particularly in the hot weather, conveys to both the ear and the eye a more refreshing feeling of coolness than foliage alone could impart.

These conservatories are provided with ventilators above and below and are heated during the colder months with two flow and one return pipes of two inches diameter, with means of regulating the heat in each at will. A cold water pipe is carried for some distance along by the sides of the flow and return pipes and is connected with a screw nozzle tap in each case. When the plants require syringing or watering a piece of flexible tube, with a nozzle at the other end, is screwed on to the tap, and water with the chill off is thus at command.

Palms appear to do equally well in all the cases, especially species of *Seaforthia*, *Latania*, *Aroca*, *Geonoma*, etc. These, with *Aspidistra lurita* var, *Ficus elastica*, *Dracenas* and a few other things, form the leafy decoration of the two more gloomy cases, the climbing-fig growing well, and the Japan *lygodium* hanging in bunches from the wires attached to the roof.

In the lighter cases there is more variety, the climbing-fig hanging in

graceful festoons, while *Begonias*, *Marantas*, *Anthuriums*, *Cyperus*, and numerous ferns, together with many of the plants previously mentioned, look quite happy.

As the effects described are the results of plants put in several years ago, we are not premature in pronouncing the arrangement to be a great success, and we can well imagine the relief which the jaded man of business must derive from partaking of his hasty luncheon under such influences.

HOW TO WATER.

Every one thinks he can water plants, whether in or out of pots. But one might almost count the good plant waterers on his own fingers. This may seem strange to those whose idea of watering consists in dipping a pot in a tank and emptying it on the plant; and yet stranger to those who, with even less care, simply attach a hose to the water and fire away right and left, behind and before, and when tired of this amusement declare their plants and gardens to have been well watered.

There is yet a third way of watering, an example of which came under the writer's notice the other day. He was struck by the smallness of the pot with which a youth was watering some pot roses, and confounded by the time that the small potfull lasted. Looking more closely, he observed that the watering pot was furnished with a fine nose, and the waterer was giving to the surface of each pot only a sprinkle — making a supply for two pots make-believe water twenty or more.

This surface sprinkling is the most mischievous of all modes of watering. It allures the thirsty roots to sure destruction. They scent the water from

afar, come up to the surface to taste, find little or no moisture, and are caught at the worst possible place by a scorching sunbeam which cripples them for life or withers and destroys them on the spot. These mock waterings are repeated until there are no more surface roots to be destroyed, and until the mass of roots below have utterly perished from thirst, daily, under the specious veil of a sprinkled surface.

The first canon in the art of good watering is to water thoroughly, and in such quantity as to thoroughly soak the whole mass of roots and moisten all the soil that surrounds them. In a word, a good watering means a flooding—so that the farmer who turned the river over his Mangel was really a scientific waterer on a large scale. But the next point of moment is promptly to turn off the water when enough has been given, and not turn it on again until the roots be dry and need it. Next to the surface dribblers the incessant soaker is the worst plant waterer. He gives enough, but he gives it when it is not needed, or whether it is needed or not. After thoroughly watering a plant the waterer should see that no more is given until it is quite dry. Watering at fixed hours, regardless of condition, kills its thousands.

The second canon in the art of good watering is never to water a plant until it is dry. The degree of dryness at which it is safe and right to water is often a most difficult point to determine. Rapid growing plants, such as Pelargoniums, Fuchsias, etc., generally show by the surface soil when they are dry, but this is not always a sure test. Experienced florists can tell by the weight of the pot, but a surer way is to strike the pot a sharp blow with the knuckles. If the sound is heavy or

dead the pot needs no water, but if, on the contrary, it rings—in a measure as clear as a bell—it needs to be watered thoroughly.

The next important point is the sort of water used. This should be pure and soft. Hard water will often kill hard-wooded fine rooted plants. Therefore, rain water is the best, and next to this river water. If spring water must be used, it should be exposed in open tanks or barrels several days. Cold water is almost as injurious as is hard spring water. Hence the chill should always be taken off, and if this be done in the sun it is yet more beneficial.

Evening is undoubtedly the best time to water plants, because that water given in the morning is quickly dissipated and the rapid evaporation produces an amount of cold that checks rather than stimulates growth. When watered in the evening the roots have time to absorb their drink all night long. Every part of the plant is thus filled with moisture, and the morning finds it in renewed health and vigor.—*Villa Garden.*

FRESH WATER POLYPS.

In most brooks and ponds we find adhering to stones, plants or dead leaves, and, indeed, to any secure foothold, numerous minute creatures which appear, when viewed with the unassisted eye, like miniature flowers, either of a grayish, or more commonly, of a green color, the latter of which is called *Hydra viridis*: the former *H. fusca*. It is called *Hydra*, on account of some fancied resemblance to the many-headed creature of mythology bearing that name. The fresh water hydra, however, has really but one

head, and the other members that appear like heads, are but the arms or tentacles arranged in a circle around the mouth. If we should take one of these curious little hydras, and cut it transversely through its body, we shall find that the part that bears the head will form for itself a new body and foot; while from the other portion, which is but a foot, will grow a new head and tentacles. We can also cut a hydra longitudinally in several pieces, and such portion will supply itself with the wanting parts, and become a perfect animal. We can turn it inside out, and the part that was the lining of the stomach will become the exterior skin or cuticle; and the cuticle will take upon itself the offices of the stomach. And like experiments can be made on sea anemones with similar results, but they are, as a general rule, more tender than their fresh water relations; and, indeed, there are many of the species that will certainly die under the operation; for we find that on separating them from the rock to which they are attached (if we are not very careful to avoid injuring, in any way, the tender part of the animal), any wounded part will decay, and finally kill the creature. In one of our tanks we have now about fifty of both kinds, *H. viridis* and *H. fusca*, sitting on the glass sides and the plants. They must have been accidentally introduced to the tank with some plants last September, as the aquarium has not been disturbed since.

FERNS.

(Continued from last number.)

In the last number we promised to mention a few varieties of ferns suit-

able for house cultivation. First and most desirable comes the *Adiantum*.

Adiantum pedatum is the native maiden hair of our woods, and is the only one of this family that is a native of the United States. It grows well in a pot during the summer, but upon the approach of winter, no matter how warm and sheltered you may keep it, the foliage dies, and the plant rests until spring, when it renews its beauty.

Adiantum capillus veneris is a charming little evergreen British fern, with fronds from six to twelve inches high, fan-shaped and of a rich bright green color.

Adiantum crispulum has handsomely curled fronds of a rich dark color and makes a very beautiful specimen plant.

Adiantum formosum is a fine strong growing plant with jet black stems and cheerful, light green fronds.

The above three varieties of *Adiantum* are easily cultivated, do not require a high temperature, and will bear a great deal of hard usage. All the rest of this family are also very beautiful, but more tender, requiring the aid of a green house or Wardian Case to grow them in perfection.

Asplenium viviparum is a most beautiful little fern, indeed we think it the prettiest of all of the small growing kinds. The fronds are about a foot high, very finely dissected and somewhat curled, and covered on the upper surface with young plants. It is very easily cultivated, grows vigorously and shows a compact bushy mass of foliage. But it is very impatient of dust, particularly coal dust and smoke. We have not been able to carry it through the winter in this city without a covering of glass. A bell glass placed over the pot is a pretty ornament, and allows the plant to grow luxuriantly. In the country

we think it would flourish in the room without the glass.

Asplenium inequalifolium is somewhat similar to the last, but the fronds are not so finely cut, and the young plants upon their upper surface are not so numerous. The plant is also larger and much more hardy. As its name implies, the fronds are unequally dissected, some being quite coarse and others fine, which gives the plant a singular but not unpleasing appearance. This is a desirable addition to a collection.

Scolopendrium uredulatum or Hart's Tongue has thick leathery fronds, which are mostly undivided, eight or ten inches high, and are produced very rapidly. It has a thin creeping stem, much branched, soon fills the pot and reaches over the rim, adhering by its hairy roots to the moist sides of the pot, and throwing up leaves so thickly that the whole vessel is soon completely hidden.

Scolopendrium officinarum is similar to the last but grows more slowly and never shows so many fronds at the same time. The edges of the leaves have a wavy appearance. Both of these are very desirable.

Lomaria gibba is one of the most beautiful ferns known. It is of very regular, graceful and rapid growth, and forms a stem with age. The growth of our specimen has not been interrupted in the least during the coldest weather. Any one who will give this plant reasonable care will find it satisfactory in every respect.

Nephrolepis exaltata is the sword fern so much used in hanging baskets. This is too well known to need description. It is of the easiest cultivation, and indispensable, no matter how small your collection may be.

Pteris tremula is another well known and easily managed species. The only objection to it is, that its growth is so rapid, under careful cultivation, that it soon becomes too large to handle conveniently. It should be placed out of doors in the shade during the summer, and frequently shifted.

Pteris argyrea is a showy species with fronds from two to four feet long, of a silvery white color, with light green margins. It is a rapid grower, but rather tender.

Pteris cretica alba lineata is a very attractive fern, with fronds about a foot long, very bright green, with a broad white stripe running through each pinnule. It is very easily managed.

Pteris serulata. This old Chinese fern, with its grass-like foliage, will thrive under almost any kind of treatment. Nothing seems to kill it except frost or red-hot mid-summer sunshine. It is indispensable in a collection.

Pteris serulata cristata is similar to the last, but has broader and more erect fronds, with the apices beautifully crested. It is equally hardy.

We might go on to enumerate many others no less beautiful and desirable, but we only promised to mention a few of the most common and easily cultivated as a guide to beginners.

THE LATTICE OR LACE PLANT.

(*Ouviranda Fenestralis*.)

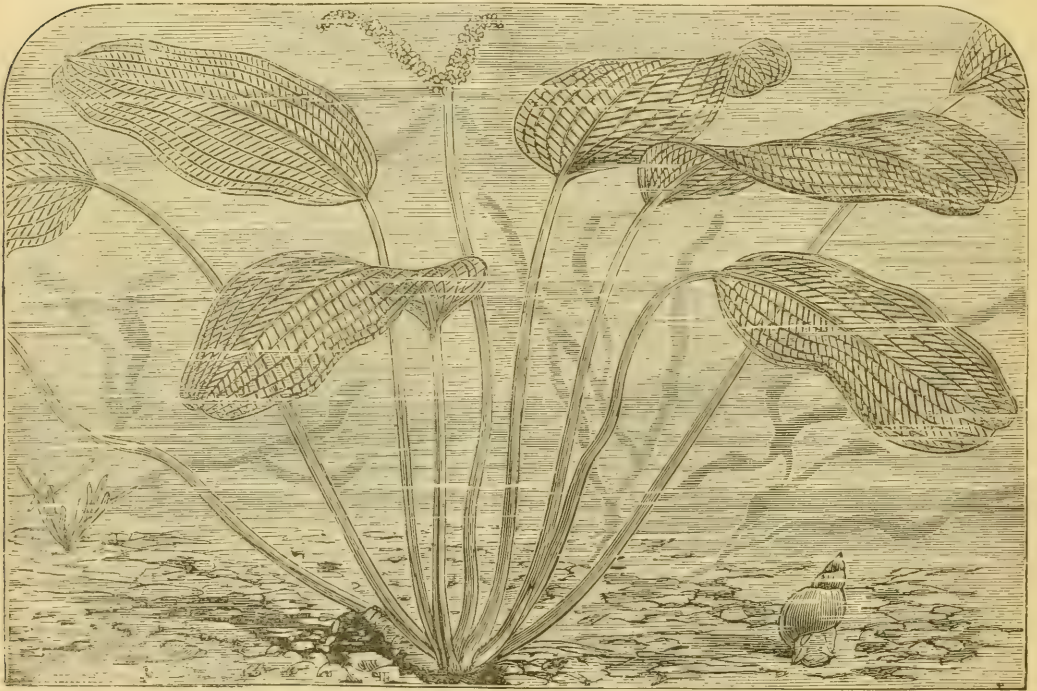
One of the most curious plants which have recently engaged the attention of those who are interested in floriculture and kindred growth, is a specimen known as the lattice plant, of aquatic habits, and brought from Madagascar as a rare acquisition. Its existence has for a considerable time past been known to botanists through a few

dried leaves sent from Madagascar by a traveler, who was unable to transmit living specimens of the curiosity he had discovered, and it was not until a long period thereafter that this desirable object could be attained, when several of the living plants were safely brought from the above-mentioned country by Rev. Mr. Ellis, the well-known missionary. The interest of this plant lies in the extraordinary structure of the leaves, which, unlike those of any other

plant at the conservatory of the Executive Mansion in Washington, D. C.

INTERDEPENDENCE OF ANIMALS AND PLANTS.

The *Gardner's Chronicle* gives an engraving of a very remarkable pitcher plant, new to cultivation, but described by Dr. Hooker, a few years ago, from dried specimens collected in Borneo by Low and others. The large bag-shaped



THE LATTICE OR LACE PLANT.

known plant, are made up of the ribs and cross veins only; the interstices, which, in other leaves are filled up with cellular tissue, being in this case left almost entirely open, and thus giving to the leaf the appearance, in every respect perfect and beautiful, of a piece of well-wrought net or lattice work, from which it derives its name.

We saw a very fine specimen of the

pitchers are, when fully developed, provided with two sharply toothed wings. The neck of the pitcher is thrown into ridges with intervening furrows, and is prolonged at the back into an erect, or slightly incurved process, terminating in two sharp recurved spurs, the whole reminding one of the head of a snake uplifted and ready to strike with its fangs. At a recent meeting of the

Linnaean Society, Mr. Burbridge, an observant naturalist, read a paper on the subject, which throws some light on the curious organization in question, and is of considerable interest as illustrating the solidarity of the organic world. It seems that the stalk of the lower bag or ampulla-shaped pitcher is swollen and hollow, and in their native country most of them are perforated by a species of black ant, which forms its colonies in the old and dry pitcher, and continually visits the fresh ones, so far as can be determined, for the purpose of obtaining food and water, since these fresh pitchers contain a miscellaneous collection of dead and decaying insects of many kinds. As these pitchers are perfect traps to creeping insects of ant-like character by reason of the incurved ridges round the throat of the pitcher, these black ants ingeniously perforate the stalk, and so obtain their supplies, and provide a means of exit in case of need. Now as to the uses of the formidable spurs which lie concealed under the kidney shaped lid of the pitchers: There is found in the Bornean forests, where this fine pitcher plant grows, a curious little animal called by the natives "Tamperlilie," and by the few Europeans who have ever seen it alive, the "Spectre Tarsier," (*Tarsier spectrum*). It is a most singular and interesting creature, about the size of a rat. Its head is singularly like that of a small kitten; the eyes are large and full, the body is monkey-like, and the tail is slender and as long as the body, but bushy at the tip, like that of a lion. Its feet have curiously enlarged disk-like tips, reminding one of the enlarged ends of the climbing tendrils of the Virginia creeper. This little animal is an insect eater, and knowing that the pitchers contain entrapped insects,

visits them pretty regularly. In the case of some of the pitcher plants, the insects imprisoned in their unarmed urns are readily removed, but not so in the species under consideration, as the sharp spurs are so placed that the tarsier is sure to be pricked by them, and quite sharply too, if its head is inserted under the lid for getting at the interior. The main question, and the one yet to be solved, is, of what use are the living ants, and what end is this one species of *Nepenthes* made to serve as the nest of a peculiar species of these insects. To suit its requirements not only is its very structure modified, but especial precautions are taken to ward off the insect-eating tarsier. The use of the entrapped insects we already know, for it has been demonstrated by Dr. Hooker that the pitchers of *Nepenthes* not only allure insects by a sweet secretion at the rim and upon the lid of the cup, but also that their capture, or the presence of other partly soluble animal matter, produces an increase and an acidulation of the contained watery liquid, which thereupon becomes capable of acting like gastric juice in dissolving flesh, albumen, and the like. In other words, these pitchers seem to be stomachs. Borneo is indeed a land of many wonders. Dr. Beccari has found there a curious plant (*Myrmecodia*) which never fully develops until bitten by a large red ant. They make their nest in the swollen stem, and thence rush out to repel all invaders. Dr. Beccari asserts that the presence of these ants is absolutely essential to the plant's existence, for unless the young plants are thus attacked they soon perish.

Show this copy to some friend.

Drift Wood.

· LOVE ME, LOVE MY DOG.

"Love me, love my dog," is exemplified in more instances than one, and it remained for one of the thousands of homeless wanderers in the streets of Chicago to furnish the latest illustration. He was ill clad and had a half-starved look as he stepped up to Desk Sergeant Ed. Perry. Following close at his heels was a dog, somewhat sorer looking for a docked tail, a few bare spots on his coat, and one ear up more than the other. One of his eyes was riveted on a reporter for the *Evening Journal*, who was present to pick up any little police news, but who, instead, had his eye opened to true humanity in the rough looking specimen before him, and instead of securing a blood-curdling murder news item, he recounted for his paper the following touching episode:

"Scab and me wants a place to sleep!"

"All right," said the Sergeant, "get down stairs, quick."

The face of the wayfarer brightened.

"My name's Dick Dunn," he said, "and I'm on a tramp from Laporte to Oshkosh. I'm dead broke, and it's mighty good in you in giving us a place to sleep."

As he spoke he stooped down and picked up the bobtailed dog. At the same moment the Sergeant caught sight of the cur.

"What are you going to do with that dog?" he asked.

"Well, Scab needs a night's shelter, just as much as I do."

"We can't house dogs," said the Sergeant, decidedly. "You can stay, but you'll have to throw the cur out."

The face of the tramp was a study.

"Why, say, Cap," he said, "Scab's been my friend for five years, and he walked all the way from Laporte with me. You wouldn't have me give him the go by would you?"

"I'm sorry," responded the Sergeant, "but we can't have any dogs in the station."

Dunn looked down at the dog and gently patted its head.

"It's a cold night, Scab," he said, "a mighty cold night, but where I go, you go too, and if the police won't have you in the station, they won't have me, either. We'll

walk the streets all night before we part company."

The dog seemed to comprehend and gave a low bark, and without another word the man and cur went out. Efforts to get shelter for himself and the dog at other stations failed, and they spent the night in the streets.—*American Field*.

FISH TO GIVE AWAY.—Uncle Sam is hard enough upon a good many of his working people, but he is generosity itself when it comes to giving away books, flower seeds, cuttings and goldfish. The Fish Commission announced to-day that it had no more goldfish to give away, and coupled its announcement with the astonishing information that during the past five years it had given away no fewer than 20,000 goldfish. For several years the goldfish department of the commission has absorbed more energy and cash than any other, notwithstanding the fact that there is no law requiring or authorizing the government to stock the parlors of the people of this city with goldfish. Congressmen started the business by requesting the commission to send a globe of fish to some of their friends, and as the commission was always wanting an increased appropriation, it complied with the demands. Up to this time, it is estimated by the officials that nearly a third of the houses in the District of Columbia have been supplied with goldfish at the government's expense.

There is a good deal of human nature in fish commissioners, as in common people, and they accomplish their ends by much the same means, conciliating those through whom their aid must come. If a scoring is due anywhere it is to the congressmen who in a sense compelled this work at the hands of the commission. The wrong lies in supplying the rich, who have the means to supply themselves, unless the poor have equal privileges, and this latter we think to be the case, to wit: That any person could, on application, secure goldfish from the commission while the supply lasted.

This being true, we do not look upon the money spent in this department as a waste. We would like to see an aquarium of well-selected small varieties of fish in every home in the land. They are a source of refining pleasure, of thought, of study, of observation, of education, to better the old and the young, forming a constant object lesson in natural history. Families that have not an aquarium should strive to get one, and our national and state fish commissions should encourage them in this, making it easy for them to come into possession of the varieties of fish necessary to stock the aquarium.—*The Chicago Herald*, Nov. 23.



For the small sum of fifty cents in advance, which pays for a year's subscription to *THE AQUARIUM*, you are entitled to ask information on any point regarding the aquarium or the window garden. We offer no other premium to our subscribers than that of putting our 25 years of practical experience in these branches at their disposal. Ask as many questions as you please, but please to enclose postage for reply. All questions are answered by mail, and we publish only such in these columns as are of general interest.

Mrs. K.—Angle iron is bar-iron, which, instead of being flat, is shaped in the rolling-mill to form a right angle. It comes in bars of about twenty feet in length. From these bars sections of any length may be cut by any iron worker. The price is very reasonable, one inch angle iron costs about three (3) cents a running foot. The cost of the glass for an aquarium 24x12x15 high, is about \$1.50. This includes the glass bottom.

Water snails are small fleshy animals that live in hard spiral-shaped cases (shells). Sea shells are the empty cases of those frequenting the ocean. They feed on vegetable and decomposing animal matter; for that reason they are excellent scavengers for an aquarium.

Mr. M.—When minnows are affected with fungus it is generally caused by rough handling when they are caught. Many people take hold of the minnows' tails when they pick them up, this being the quickest way to take them up. This mode may be good enough when the minnow is to be used to bait a fishing

line, but when it is to live in an aquarium fungus will soon appear on the bruised part, spreading from here forward, and when it has reached the middle of the body the fish dies. If newly caught minnows are subjected to a salt bath, one teaspoonful to a gallon of water, and left in this for a couple of days, they will generally come out all right and enjoy life in an aquarium for a year or two.

Dr. B.—It would not be safe to put your Paradise fish in a pond together with goldfish. The Paradise fish would manage to hold their own, but the young goldfish would be devoured by them as soon as hatched. One of the main advantages of the Paradise is, that it needs not to be put out of doors in order to spawn, and one is thus enabled to watch the entire, very interesting proceedings of nest building, spawning and rearing of the young. After the young are about ten days old they may be put in an out-of door basin and, if it has a warm exposure, they will grow very rapidly without artificial food and develop very brilliant colors.

Miss Kitty.—In our book we do not mention artificial feeding of the baby-fish, because it is supposed that these are "planted" in the rearing pond, where there is plenty of natural food for them. If the babies are kept in a wooden tub, a sawn-off barrel for instance, or an aquarium tank, then of course it is necessary to feed them artificially in order to make them grow. Feed them twice a day, or oftener, on powdered IXL fish food, allowing at each meal only what they will require for that particular meal. The food should be given at a regular feeding place: for instance, if you set a flower pot upside down in the center of the tub, and on

this a saucer, using the latter as the table, you can control the feeding nicely. This saucer should be washed out frequently. It is necessary in this case, too, to have aquatic plants growing at the bottom.

MISS MARY K.—Sunfish are very handsome fish, but it will never do to put them together with goldfish, except the sunfish are quite small. Catfish are not objectionable in an aquarium, but if too large, say over two and a half inches long, they will grab nearly all the food intended for the other fish and thus grow soon too large while the other fish will starve.

MRS. J. G.—Subject your camelia japonica to a higher temperature. Syringe with pure water the leaves and stem daily, and thus make it produce young growth early; these shoots will ripen and flower-buds will be formed at their extremities. Further on in the spring, when these buds appear, if the pots are full of roots, the plant should be repotted into a pot one size larger (not more), using a compost of rich, turfy loam and a little sand, then place it away in the shade, out of doors, and never let it get too wet nor too dry. After taking it into the house again its position should not be changed. Turning one side towards the light this week, and the other the next, causes the flower-buds to drop off.

MISS R. K.—The Bouvardia should have light, rich soil. If grown in pot this must be large, to give plenty of root room. It will not flower except in very warm moist atmosphere. It may safely be called the most unsuitable plant for house culture.

MR. B.—The banded water-beetle, (*Dyticus marginalis*) and the black

water-beetle (*Hydrophilus piceus*) are two of the worst things a person can put into a well stocked aquarium. Especially in the summer they display a fearful appetite. The *Dyticus* eats up anything that lives, and it can catch. First it eats all the tadpoles and snails, next it attacks the fish and if you should have a crayfish in your collection it will attack it below the tail and keep on eating until the empty shell of the crab is left. The *Hydrophilus* is not quite as bad as the former, but, being a vegetarian, soon makes its presence known by destruction among the aquatic plants. These beetles should be kept entirely by themselves in an insect aquarium, for which our frog-house design (see p. 110), is very good. If the two species are kept in one jar, the *Dyticus* should be regularly fed with small pieces of fresh beef, as it will otherwise eat the *Hydrophilus*.

Both of these beetles are subject to a kind of fungus disease, which appears first on their backs. Specimens attacked with this disease should be taken out of the water, and a little salt put on the affected parts, will cure them again.

Although we have frequently heard that these beetles leave the aquarium at night, we never had one that did.

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